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JE JACOBS ENGINEERING GROUP INC ENVIRONMENTAL SYSTEMS DIVISION

IN ASSOCIATION WITH
TETRA TECH
METCALF & EDDY
ICAIR LIFE SYSTEMS
KELLOGG CORPORATION
GEO/RESOURCE CONSULTANTS
BATTELLE PACIFIC NORTHWEST LABORATORIES
DEVELOPMENT PLANNING AND RESEARCH ASSOCIATES

# ENVIRONMENTAL PROTECTION AGENCY TECHNICAL ENFORCEMENT SUPPORT AT HAZARDOUS WASTE SITES

TES IV CONTRACT #68-01-7351 WORK ASSIGNMENT #194

ELLIOTT SHOOTING PARK SITE HISTORICAL LAND USE FINAL REPORT

**EPA REGION VII** 

JACOBS ENGINEERING GROUP, INC PROJECT NUMBER 05-B194-00

October 30, 1987

# ELLIOTT SHOOTING PARK SITE DRAFT HISTORICAL LAND USE REPORT

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#### 10 INTRODUCTION

The Elliott Shooting Park site and adjacent properties are contaminated with lead as a result of trap and skeet shooting associated with the park from 1887 to 1983. Laboratory results of surface soil samples collected from the site and the property east of the site indicated total lead concentrations from approximately 50 parts per million (ppm) to 5900 ppm

Due to the site's location and the toxic nature of lead a removal was mandated in January 1986 under a CERCLA Section 106 Administrative Order. In 1986 removal actions were initiated by one of the Potentially Resonsible Parties Boatmen's First National Bank of Kansas City.

This report has been prepared to assist the US EPA in assessing the historical dimensions of shooting areas associated with the Elliott Shooting Park and the distribution of lead contamination resulting from trap and skeet shooting on these properties. Because the primary property associated with the Elliott Shooting Park is currently under remediation, the focus of this report is on the potential use of adjacent properties for trap or skeet shooting.

This report has been organized into six sections. The site description and history are presented in Section 20. This is followed by brief discussions of historical aerial photography and topographic map investigations in Sections 30 and 40. In Section 50, the results of personal interviews are presented Recommendations for additional sampling are provided in Section 60.

#### 20 SITE DESCRIPTION AND HISTORY

Elliott Shooting Park site is located at 9530 East 75th Street in Raytown Missouri as shown on Figure 1. The site covers approximately 31 acres and is surrounded by residential and commercial properties. Southwood Heights and Parkway Manor Subdivisions are located immediately south of 75th Street near the site. A subdivision is also located directly west of the site.

The site was operated as a trap and skeet shooting target range for the recreational use of shotguns from 1887 until April 1983 when it was foreclosed by Boatmen's First National Bank of Kansas City. Other areas adjacent to the site were also suspected of being used for trap and skeet shooting during the mid 1900s in conjunction with the operation of the Elliott Shooting Park. Trap and skeet shooting resulted in the deposition and accumulation of lead shot on the ground surface. During its operation the site was periodically mined by a company which removed the shot from the soil and recycled the lead. The last mining operation took place in 1982. In 1984 soil samples were collected at the site and analyzed for lead. Laboratory results indicated total lead concentrations ranging from approximately 50 ppm to 5900 ppm

Under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980 the U S EPA issued a Section 106 Administrative Order to the Boatmen's First National Bank of Kansas City Missouri in January 1986. The Order required Boatmen's First National Bank of Kansas City to remove the extensive lead contamination on the 31 acre site.

In 1986 removal actions were initiated by Boatmen's First National Bank of Kansas City. Actions performed to date have involved the removal and washing of contaminated surface soils from several portions of the site. Lead which has been separated from the soil has been taken to a recycling facility. The washed soils have been disposed of in an approved sanitary landfill. The wash water has been contained in a holding pond for potential recycling. The pond water and accumulated sediments are to be managed as part of the removal action. Removal actions were anticipated to be completed the fall of 1987. These efforts may be continued into the spring or summer of 1988 due to difficulties experienced in the removal process and discovery of additional areas of contamination.

UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY 94 30 39 00 = Site Location Southwood Heights Parkway Manor Subdivision Subdivision 4316000m N SCALE Reference 2000 ### FEET 1000 7 5 Minute Series Topographic Map Lee s Summit Quandrangle Jackson County Missouri United States Geologic Survey 1975

Figure 1 Site Location

#### 30 HISTORICAL AERIAL PHOTOGRAPHY INVESTIGATION

#### 31 INVESTIGATION APPROACH

Historical aerial photographs were obtained and reviewed in an effort to identify shooting areas and changes in land use in the vicinity of Elliott Shooting Park over the period of its operation. The photographs were obtained from various governmental agencies and private companies. Because the Elliott Shooting Park was operated from 1887 to 1983 an attempt was made to collect photographs to span this time period. Eleven photographs dating from 1936 to 1980 were obtained to assist in the evaluation of historical land use in the vicinity of the site. Reproductions and interpretations of these photographs are provided in Appendix A.

# 32 SITE HISTORY INTERPRETATIONS FROM THE AERIAL PHOTOGRAPHS

As shown on Figure 2 the Elliott Shooting Park consisted of several buildings and five shooting areas on the north side of 75th Street until at least August 18 1936 The area surrounding the site at this time was farm land

Sometime between August 18 1936 and October 20 1952 one shooting area was added north of 75th Street to the east of the existing areas and one shooting area was added south of 75th Street directly across from the site. These shooting areas are shown on Figure 2

A few small ponds were present in low areas in the central part of the shooting area south of 75th Street in October 1952 Runoff from the shooting area south of 75th Street appeared to flow southwesterly in a swale which emptied into an intermittent stream along the tree belt west of the property (now defined as the east boundary of Mount Olivet Cemetery) This stream drained to the south as shown on Figure 2

The Gregory Heights Subdivision immediately west of the site was under development in October of 1952. This subdivision was completed by May 1955. Some commercial development also occured between October 1952 and May 1955 north of the site and along Highway 50.

Between May 1955 and June 1957 two dirt roads were constructed along the south and east border of the shooting area south of 75th Street. These roads appear to be the beginning of Southwood Heights Subdivision. This subdivision was completed by June 28, 1963. Use of the shooting area south of 75th Street was discontinued sometime between June 10, 1957 and June 28, 1963, because of the development of this subdivision.

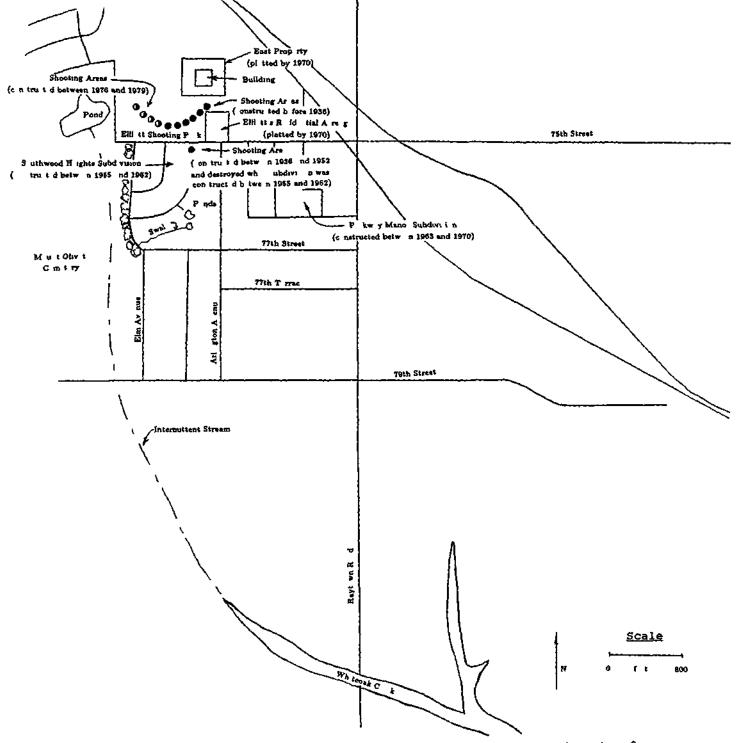


Figure 2 Historical Land Development in the Vicinity of the Elliott Shooting Park Site

Parkway Manor the subdivision immediately east of Southwood Heights was constructed between 1963 and 1970. By 1970 the land in the vicinity of the site was platted. The land immediately adjacent to the site on the east.

Elliott's residential acreage and the site area north of 75th Street were divided into separate parcels of land by 1970. No buildings were present on the east property at this time

Between March of 1976 and sometime in 1979 the shooting area north of 75th Street was expanded from six to ten shooting areas and a building was constructed on the adjacent east property Many trees were removed during the construction of this building

## 40 HISTORICAL TOPOGRAPHIC MAP INVESTIGATION

#### 41 INVESTIGATION APPROACH

Historical topographic maps of the Lees Summit Quadrangle were also reviewed to identify changes in land use and drainage patterns in the vicinity of the Elliott Shooting Park. These maps which were obtained from the U.S. Geological Survey National Cartiographic Information Center were constructed using data from surveys field checks and photographic revisions dating from 1934 to 1975. Reproductions of these maps and interpretations are provided in Appendix B.

## 42 SITE HISTORY INTERPRETATIONS FROM THE TOPOGRAPHIC MAPS

In 1934 no residential or commercial development was present in the vicinity of the site except for the site buildings and few farmsteads. A slight ridge crossed the southwestern corner of the site and mild slopes existed to the east south and southwest of the site. Runoff to the east of the site flowed into an intermittent stream which emptied into Wildwood Lakes (shown previously on Figure 2). Runoff to the south and southwest of the shooting area south of 75th Street flowed into an intermittent stream along the tree belt west of the property (now defined as the east boundary of Mount Olivet Cemetery). This stream emptied into Whiteoak Creek

The general drainage pattern which existed in 1934 continued through 1975 even though several subdivisions were constructed in the vicinity of the site. Thus the subdivisions were graded to follow the natural lay of the land. Based on the topographic maps over this period no large cuts or fills were involved in the development of either Southwood Heights or Parkway Manor Subdivisions.

The Gregory Heights Subdivision immediately west of the site was completed between 1934 and 1955 Residences also existed along two cul de sacs north of the site and along Arlington Elm 77th Street and 77th Terrace by 1955 Southwood Heights Subdivision and businesses along Highway 50 were constructed between 1955 and 1962 Parkway Manor Subdivision was under construction in 1964 and was completed by 1970 Land development remained generally unchanged between 1962 and 1975 Travel on 75th Street was light and the portion of 75th Street immediately south of the site was unpaved in 1975

#### **50 PERSONAL INTERVIEWS**

Personal interviews were conducted to aid in the interpretations of the historical aerial photographs and maps and to gain further details concerning the land use history in the vicinity of the Elliott Shooting Park

# 51 PREVIOUS OWNERS AND OPERATORS OF THE ELLIOTT SHOOTING PARK

Several attempts were made to discuss the land use history in the vicinity of the site with the following former owners and/or operators of the Elliott Shooting Park at the address provided below. These addresses were obtained from the greater Kansas City telephone directory for June 1987 1988

Mr Vernon Hill (former owner of Elliott Shooting Park) 135 South Lakeshore Drive Lake Quivera Kansas 66106 (913/268 5554)

Mr and Mrs George Heath (former owner of Elliott Shooting Park) 2304 West 120th Terrace Leawood Kansas 66209 (913/491 1303)

Mr Lynn Gipson
(former manager/resident of Elliott Shooting Park)
10605 East 78th Terrace
Raytown Missouri 64138
(816/353 0197)

Initially attempts were made to reach these individuals by telephone. Mr Vernon Hill was contacted in this manner. Calls to the other individuals were not answered. A letter of introduction from Mr. Dave Crawford of the U.S. Environmental Protection Agency and a letter requesting that the individuals contact Ms. Jill Biesma of Jacobs Engineering Group concerning land use in the vicinity\_site were distributed to the individuals who were not contacted by phone. Neither of these parties responded to this request.

A telephone interview was conducted with Mr Vernon Hill. In this interview Mr Hill stated that he had heard that the Elliott Shooting Park included land south of 75th Street at one time. However, Mr Hill said he was not aware of the specific history of the Elliott Shooting Park prior to his ownership from 1978 to 1982. Southwood Heights and Parkway Manor Subdivisions were developed south of 75th Street in the late 1950s.

# 5 2 DEVELOPER AND ENGINEERING FIRM ASSOCIATED WITH SOUTHWOOD HEIGHTS AND PARKWAY MANOR SUBDIVISIONS

An interview was held with Mr Lon Sutherland developer of Southwood Heights and Parkway Manor Subdivisions to collect information about the historical land use of the property immediately south of 75th Street near the Elliott Shooting Park Site

# 521 Confirmation of the Shooting Area South of 75th Street

Mr Sutherland said he had constructed the skeet shooting devices south of 75th Street shown on the aerial photographs. He said the devices which were boxes approximately eight feet in height width and depth attached to metal poles above the ground were made for Mr Elliott. He said they housed a mechanism which threw clay pigeons into the air.

## 522 Use of the Shooting Area South of 75th Street

Mr Sutherland said he believed the shooting area south of 75th Street was only used occasionally when there was overflow from the main shooting park north of 75th Street. He said that he remembered mining operations on the Elliott Shooting Park Site but not on the property south of 75th Street. Mr Sutherland said he believed straw was placed on the areas where shot was expected to land on the Elliott Shooting Park Site to catch the shot and make mining easier. He did not remember use of straw in the shooting area south of 75th Street. He also stated that he did not remember seeing any lead shot in the surface soils during the development of Southwood Heights or Parkway Manor Subdivisions

#### 523 Date of Development of Southwood Heights Subdivision

Mr Sutherland said he and Mr Harry Gordanier (who is deceased) bought the land south of 75th Street from their long time friend Mr Russell Elliott According to the records Mr Sutherland had kept he estimated that construction of Southwood Heights Subdivision began in 1955 Discussions with Mr Sutherland concerning the development of Southwood Heights Subdivision are summarized in Appendix C

## 524 Drainage of the Property South of 75th Street

Mr Sutherland said drainage of the Southwood Heights Subdivision followed the general drainage pattern of the land prior to development. Before development runoff flowed overland towards the southwest and into the intermittent stream along the tree belt west of the property (now defined as the east borner of Mount Olivet Cemetery). Development of both Southwood Heights and Parkway Manor Subdivisions included installation of storm sewers.

Mr Sutherland said a few ponds near the center of the subdivision were filled during the development of Southwood Heights Subdivision. Mr Sutherland also said the streets were cut to facilitate drainage. Mr Sutherland said the street cuts were very shallow because the subdivision was graded to follow the natural drainage pattern. These statements confirm the conclusion drawn in the interpretation of the historical topographic maps of insignificant cuts and fills during the development of this subdivision. According to Mr Sutherland Mr Harvey Jones was the engineer for the development of both subdivisions

# 525 Construction Plans for the Southwood Heights Subdivision

The Harvey A Jones Engineering Company and several governmental agencies were contacted in an attempt to obtain a copy of the construction plans for the Southwood Heights Subdivision. These plans were requested to assist in the selection of potential sampling locations south of 75th Street where lead shot is suspected to have accumulated.

Mr Bob Jones of the Harvey A Jones Engineering Company checked the company's archived files and reported that only one sheet of the construction plans for the Southwood Heights Subdivision was retained. He said all other plans for the subdivision had been purged. Mr Jones forwarded a copy of this sanitary sewer plan sheet to Jacobs Engineering Group. This as constructed plan sheet was dated November 15, 1956. This plan sheet confirmed Mr Sutherland's estimate of development of Southwood Heights Subdivision in the mid 1950s.

Several governmental agencies were later contacted in a attempt to obtain a full set of construction plans for the Southwood Heights Subdivision. These agencies consisted of the Jackson County Engineering Department the Raytown Public Works Department and the State of Missouri Department of Natural Resources. None of these agencies had construction records for the Southwood Heights Subdivision. In general records were not kept by these agencies until the late 1960's because construction plan submittals were not required until that time.

# 53 PERSONNEL FROM REMINGTON S TECHNICAL DIVISION

Mr Jack Heath of Remington's Technical Division (1800 243 9700) was contacted to determine the approximate projectile distance of lead shot associated with trap and skeet shooting shell loads. This information was requested to assist in the selection of potential sampling locations south of 75th Street where lead shot is suspected to have accumulated

According to Mr Heath the nominal maximum projectile distance varies with the gage of the shotgun the shot size and the land altitude

The nominal maximum projectile distances which were reported by Mr Heath for various gages of shotguns sizes of shot and land altitudes are provided in Table 1

Mr Heath said a twelve gage shotgun and a size 7 1/2 8 or 9 shot was typically used for trap and skeet shooting. Mr Heath also stated that most shooting areas are arranged such that the marksman stands approximately 16 yards behind a single target thrower in trap shooting and approximately 23 yards from the two target throwers located in a semicircular arrangement in skeet shooting. In trap shooting the target thrower has an approximate angle of coverage of 90 degrees. This angle is increased to nearly 180 degrees in skeet shooting because the targets are thrown both away from and overhead towards the marksman.

The elevation of the Elliott Shooting Park and the surrounding vicinity ranges from 950 to 1000 feet above sea level. Thus the maximum projectile distance for shot in the shooting area located south of 75th Street is anticipated to be 900 feet as shown on Figure 3. Approximately 80 percent of the shot is expected to have landed within 800 feet of the target throwers. Two areas are expected to have a greater concentration of lead shot because of the target patterns generally associated with skeet shooting. These areas which are common to both target throwers for an angle of approximately 120 degrees are located 120 to 240 feet from the target throwers (where some shot lands when a target is hit) and 600 to 800 feet from the target throwers (where shot generally lands if its projectile is not disturbed). These areas of probable concentrated contamination (lead shot accumulation) south of 75th Street are shown on Figure 3.

The results of analyses of soil samples collected from the Elliott Shooting Park north of 75th Street were compared to the estimated projectile ranges. The highest concentrations of lead shot on the site property north of 75th Street occurred between 125 feet and 220 feet and between 750 and 1000 feet from the trap stands. No significant concentrations were found at a distance of 1000 to 1100 feet from the trap stands. These findings support the suspected contamination pattern associated with the shooting area south of 75th Street

TABLE 1
NOMINAL MAXIMUM PROJECTILE DISTANCES

Shot Gun <u>Gage</u>	Shot <u>Size</u>	Land altitude (NGVD)	Nominal Maximum Projectile Distance
10	2	12 000 feet	1480 feet
		0 feet	1060 feet
12	7 1/2*	12 000 feet	1060 feet
		0 feet	770 feet

<sup>\*</sup>Size 7 1/2 shot is the largest size generally used for trap and skeet shooting.

Use of smaller shot would result in a shorter projectile distance.

I

# 60 RECOMMENDATIONS FOR ADDITIONAL SAMPLING

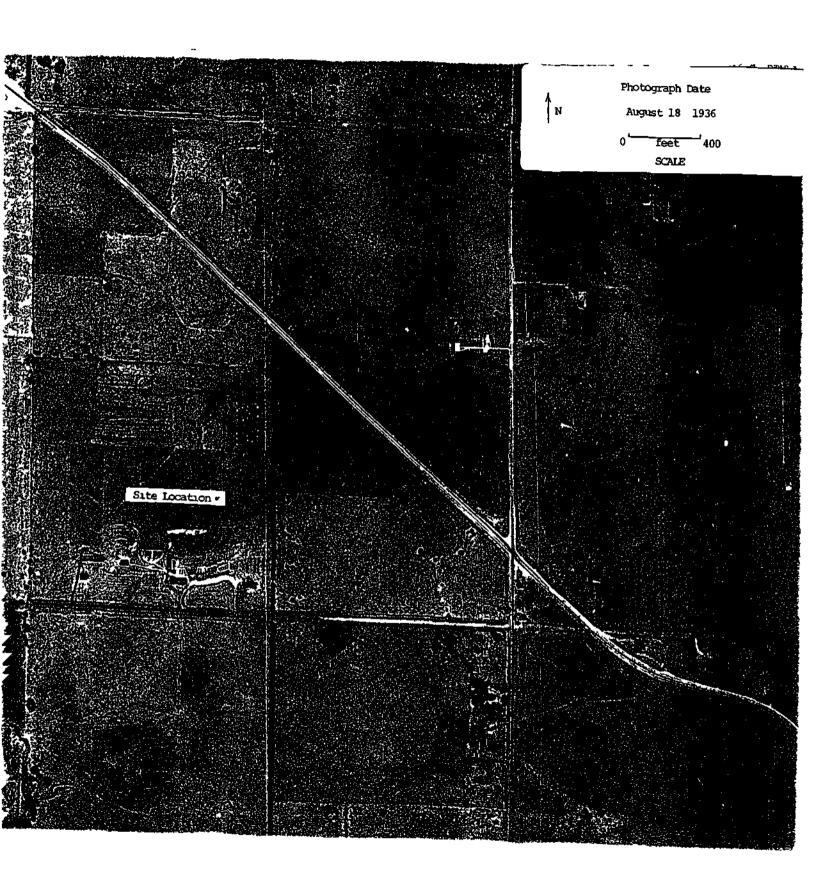
Collection and analysis of several soil samples from the Southwood Heights and Parkway Manor Subdivisions are recommended to determine the extent and concentration range of lead contamination due to skeet shooting south of 75th Street

It is recommended that these samples be collected from the areas of probable concentrated contamination (lead shot accumulation) shown on Figure 4. These samples should be collected at least 50 feet from the edges of the streets to avoid collecting samples in areas which may have been disturbed by street construction and/or utility installations and areas contaminated by automobile exhaust.

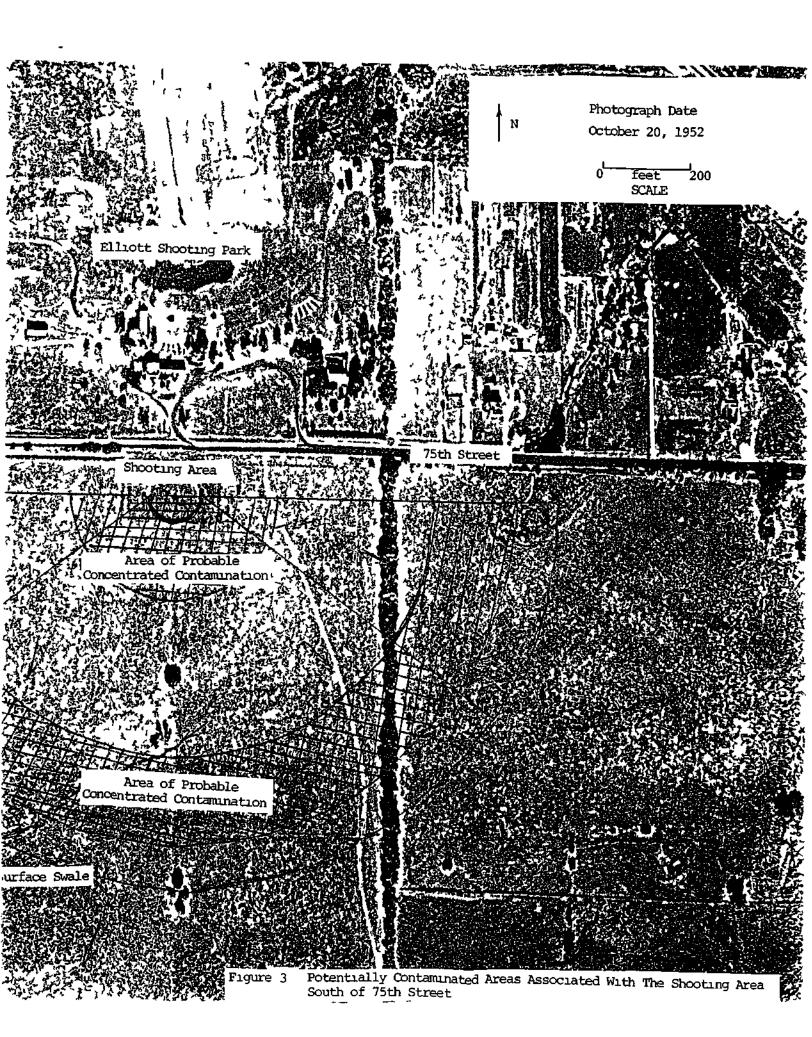
Samples should be collected at a depth of zero to three inches below the sod. This depth is the most likely to be disturbed under a residential scenario

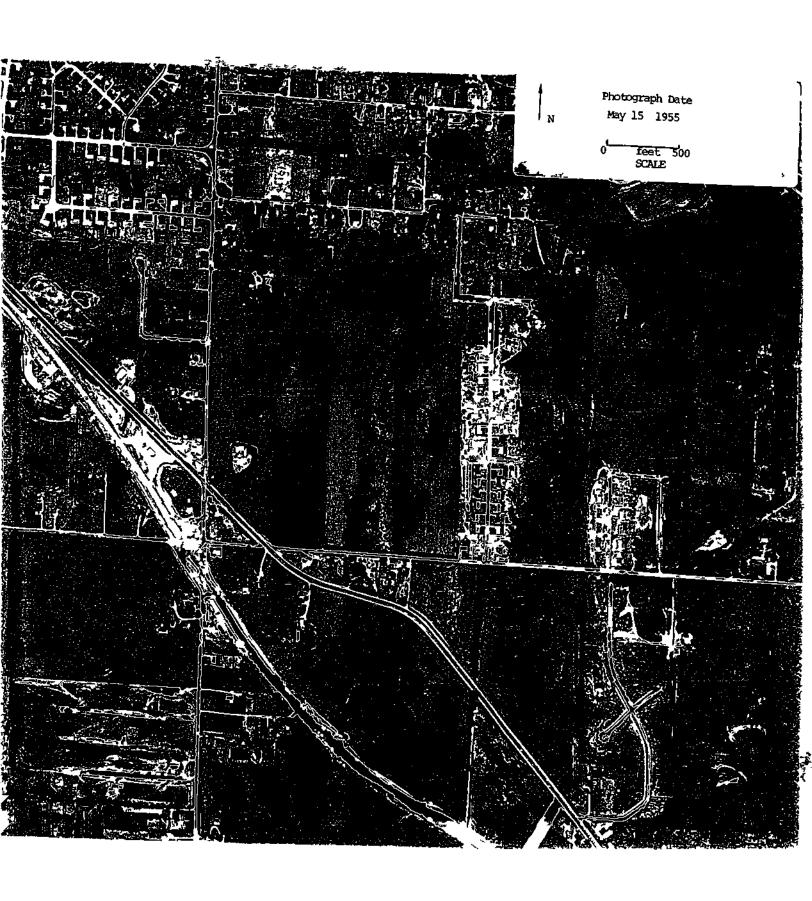
It is further recommended that a sediment sample be collected from the intermittent stream which is located along the east border of Mount Olivet Cemetery

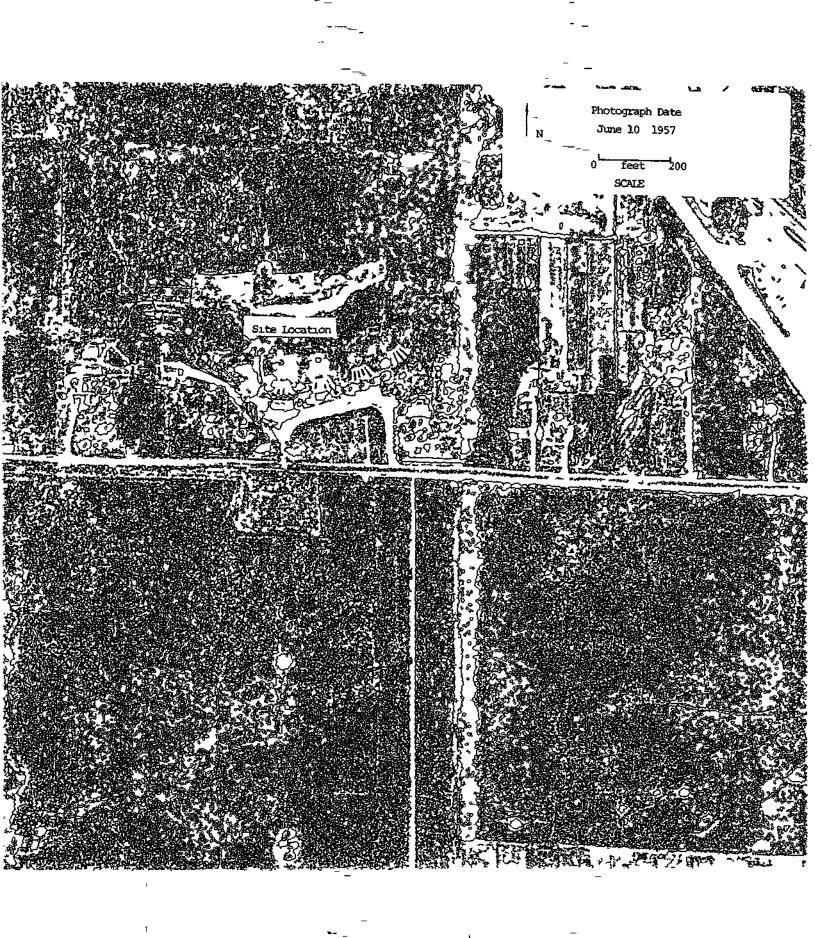
APPENDIX A HISTORICAL AERIAL PHOTOGRAPH INTERPRETATION

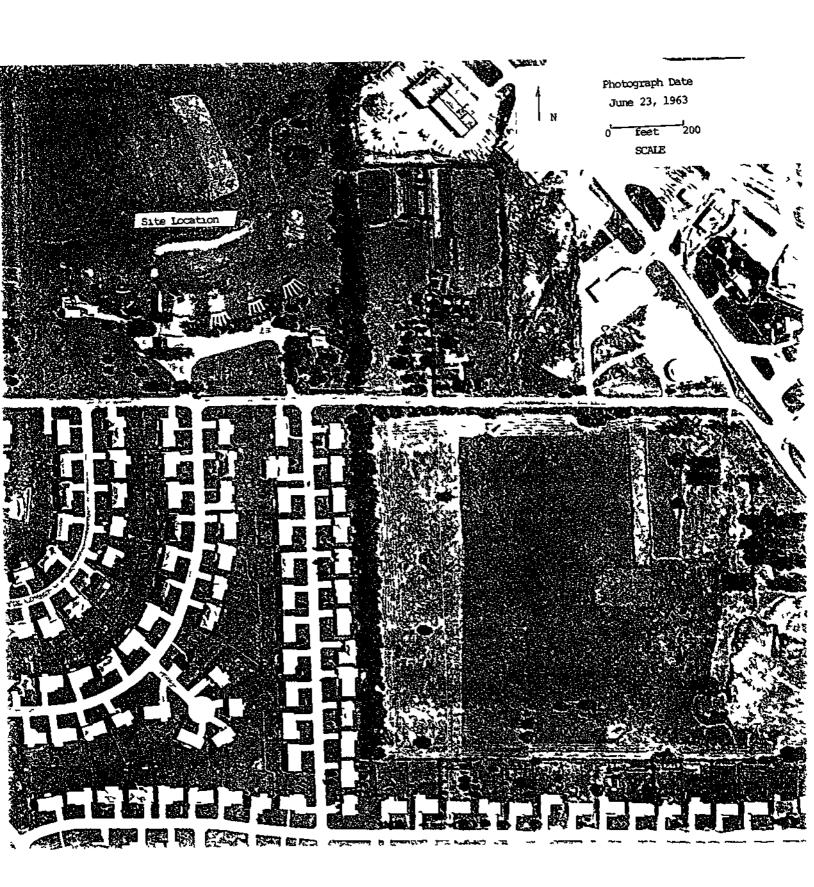


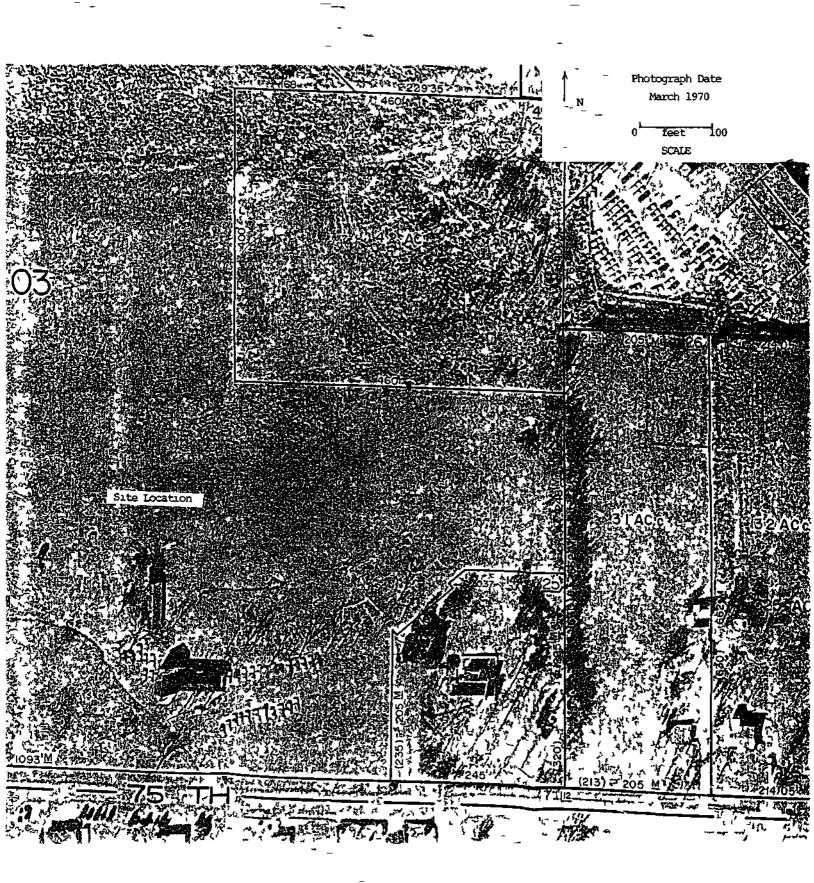
Photograph Date October 20 1952 feet SCALE

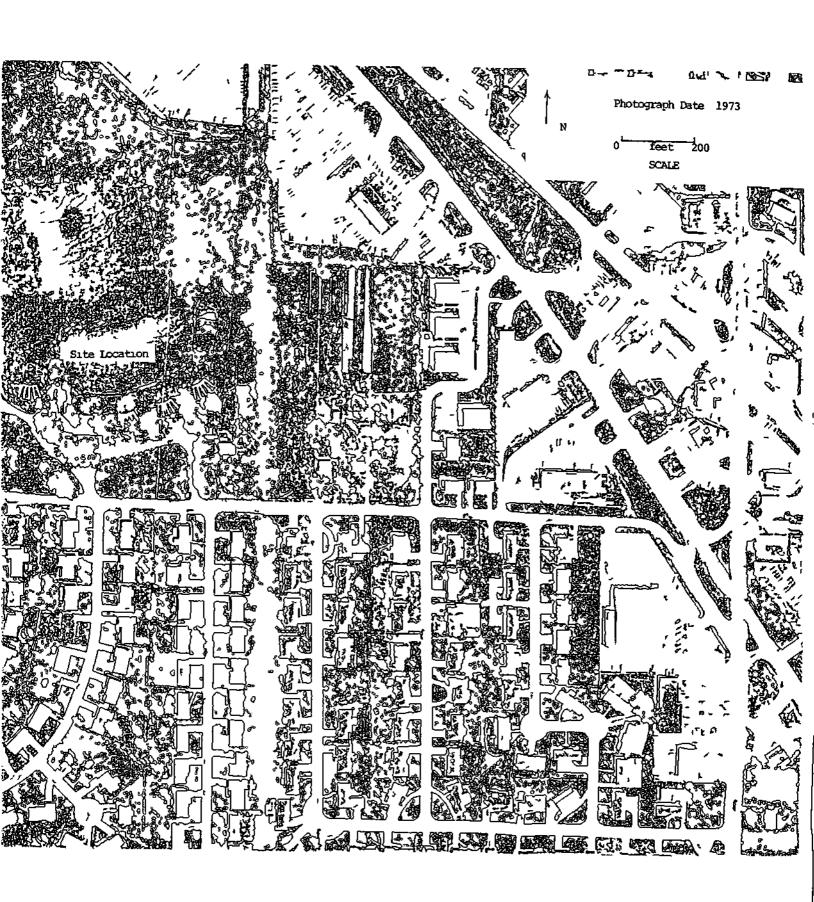


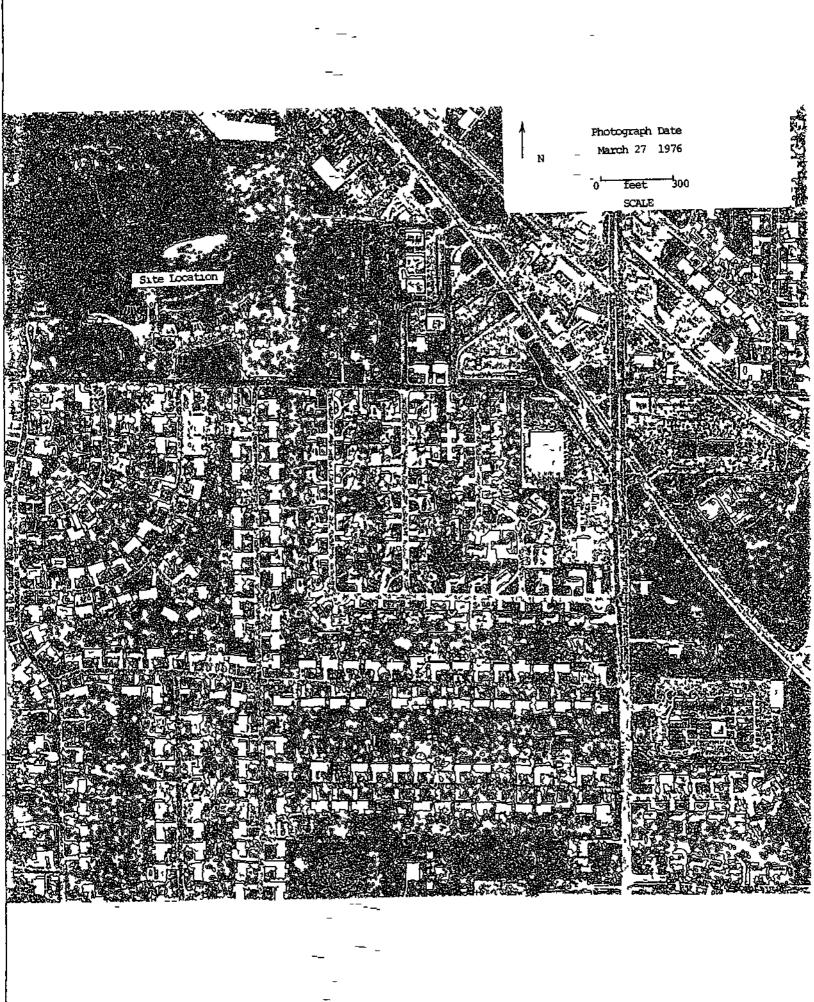




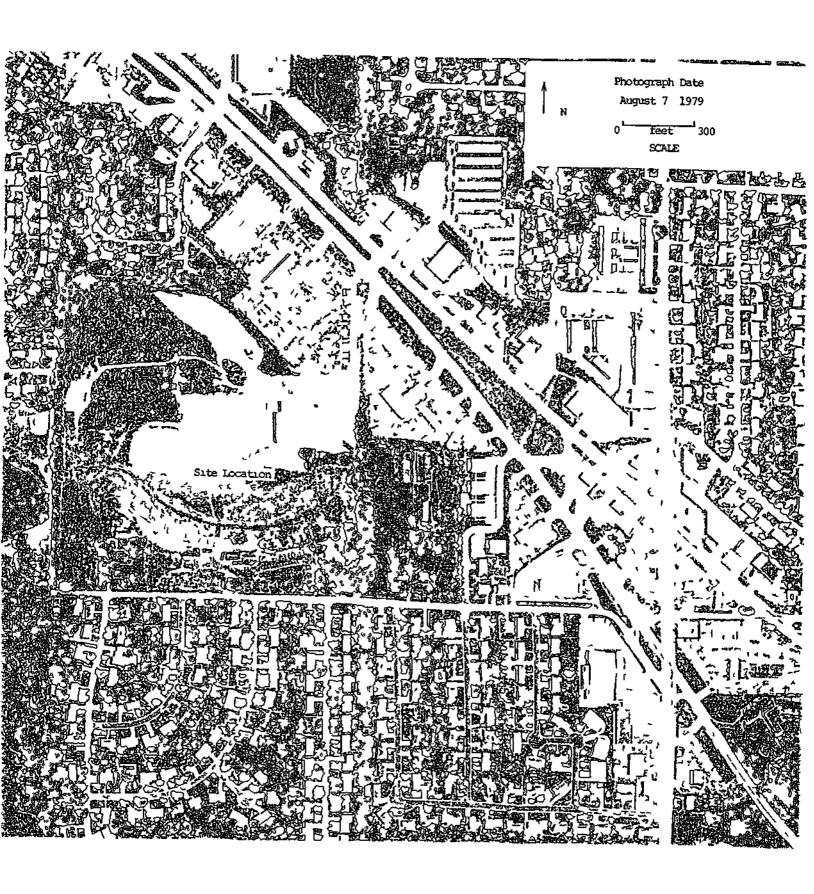












\_ November 1980

APPENDIX B ĦĨSTÕRICAL TOPOĞRÁPHIC MAPINTERPRETATION

# Dates of Map Preparation and Revision

Survey 1934 Partial Highway Revision 1949

# Land Development in the Vicinity of the Elliott Shooting Park

In 1934 no residential or commercial development was present in the vicinity of the site except for the site buildings and a few farmsteads

A slight ridge crossed the southwestern corner of the site and mild slopes existed to the east south and southwest of the site Runoff to the east flowed into an intermittent stream which emptied into Wildwood Lakes Runoff to south and southwest flowed into an intermittent stream which was located halfway between Blue Ridge Boulevard and Raytown Road (now defined as the east boundary of Mount Olivet Cemetery This stream emptied into Whiteoak Creek

Survey 1934
Aerial Photography Revision 1955
Field Check 1957

The general drainage pattern which existed in 1934 was present in 1957

Travel on 75th Street which was unpaved immediately south of the site was very light Residences were present in the Gregory Heights Subdivision directly west of the site and along two cul de sacs north of the site. To the south of 75th Street residences were present on Arlington Elm 77th Street and 77th Terrace. No residential development existed immediately south of 75th Street near the site.

Aerial Photographs 1955 Revised Aerial Photographs 1962 Field Check 1964 The general drainage pattern which existed in 1934 was present in 1964

Southwood Heights Subdivision was constructed by 1962 Parkway Manor Subdivision was under construction by 1964 Businesses were also present along Highway 50 Travel on 75th Street which was unpaved immediately south of the site was light

Aerial Photographs 1955 Revised Aerial Photographs 1962 1970 1975 The general drainage pattern which existed in 1934 was present in 1975

Land development was generally the same as in 1964 Travel on 75th Street was light The portion of 75th Street immediately south of the site remained unpaved DE104-30
050000 FEET UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY 1030000 FEET LANDING FIELD Site Location rang alloy 57 30 SCALE N 1934 Survey feet 200 1949 Highway Revisions

• ,

# Date of Photograph

# Land Development in the Vicinity of the Elliott Shooting Park

June 28 1963

All previously constructed shooting areas except for the area south of 75th Street were present ın 1963

The Southwood Heights Subdivision was completed by 1963 Use of the shooting area south of 75th Street was discontinued because of the development of this subdivision Runoff from the Southwood Heights Subdivision was routed to a storm sewer system constructed in conjunction with the subdivision

1966

The shooting areas in 1966 were the same as those in 1963

Except for the completion of Parkway Manor Subdivision immediately east of the Southwood Heights Subdivision land development in the vicinity of the site in 1966 was the same as in 1963

1970

The shooting areas in 1970 were the same as those in 1963

The land in the vicinity of the site was platted by 1970 The land immediately adjacent to the site on the east Elliott's residential acreage and the shooting area north of 75th Street were platted as separate parcels of land No buildings were present on the property immediately east of the site

1973

Land development in the vicinity of the site was the same as in 1970

March 27 1976

Land development in the vicinity of the site was the same as in 1970

1979

By 1979 the site was expanded from six to ten shooting areas north of 75th Street A building was also constructed on the property immediately east of the site by 1979. Many trees were removed during the construction of this building

1980

Land development in the vicinity of the site was the same as in 1979

# Date of Photograph

# Land Development in the Vicinity of the Elliott Shooting Park

August 18 1936

Elliott Shooting Park consisted of several buildings and five shooting areas on the north side of 75th Street which was a unpaved road The area surrounding the site was farmland

October 20 1952

Elliott Shooting Park included six shooting areas on the north side of 75th Street and one shooting area south of 75th Street

The Gregory Heights Subdivision immediately west of the site was under development. The runoff detention pond to the south of this development was constructed and full of water Except for this subdivision the land surrounding the site was farmland.

A few small ponds were present in low areas in the central part of the shooting area south of 75th Street Runoff from this shooting area flowed southwesterly in a swale which emptied into an intermittent stream along the tree belt west of the property

May 15 1955

The shooting areas in 1955 were the same as those in 1952

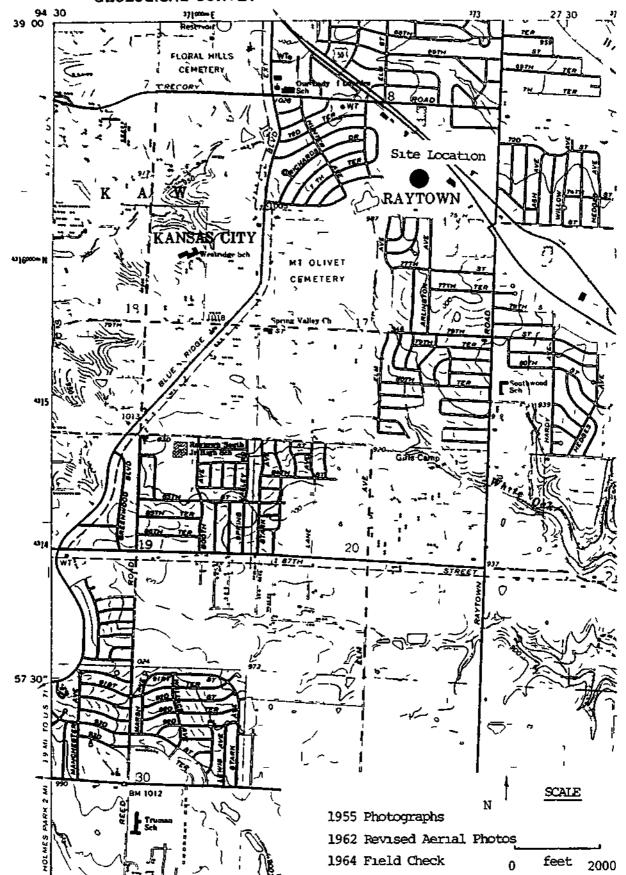
The Gregory Heights Subdivision was completed by 1955 Some commercial development also occurred between 1952 and 1955 north of the site and along Highway 50

June 10 1957

The shooting areas in 1957 were the same as those in 1952

Land development in the vicinity of the site in 1957 was the same as in 1955 except for the addition of two dirt roads along the south and east border of the shooting area south of 75th Street These roads appear to be the beginning of the Southwood Heights Subdivision

# UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY



# UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY



# PAPPENDIX C

SUMMARY OF DISCUSSIONS WITH MR LON SUTHERLAND, DEVELOPER OF SOUTHWOOD HEIGHTS AND PARKWAY MANOR SUBDIVISIONS

## MEMORANDUM

TO Mr Dave Crawford

DATE September 24 1987

FROM Jill R Biesma

SUBJECT This memorandum summarizes the topics discussed during the meeting on September 23 1987 concerning the historical land use of the property immediately south of 75th Street near the Elliott Shooting Park Site. The discussions included details of the development of Southwood Heights and Parkway Manor Subdivisions.

ATTENDING

Dave Crawford US EPA (913/236 2856)

Lon Sutherland Developer of Southwood Heights and Parkway Manor Subdivisions 7605 Evanston Raytown Missouri (816/353/1897)

Jill R Biesma Jacobs Engineering Group Inc (913/492 9218)

# PURPOSE OF THE MEETING

The purpose of the meeting was to collect information from Mr Sutherland on the historical land use of the property immediately south of 75th Street in Raytown Missouri near the Elliott Shooting Park Site

## SUMMARY OF MEETING DISCUSSIONS

Mr Sutherland began the meeting by discussing the records that he had kept pertaining to the Southwood Heights and Parkway Manor Subdivisions Mr Sutherland said he and Mr Harry Gordanier (who is deceased) bought the land south of 75th Street from their long time friend Russell Elliott He said a portion of the property now defined as Parkway Manor was once owned by a Mr Green from Olathe Kansas

# Date of Development of Southwood Heights

Mr Sutherland's records showed that he sold lots numbered 153 and 154 of the Southwood Heights Subdivision in January 1959. He also had a gas refund record from February 1959 for lots 117 and 150. Mr Sutherland said he didn't receive gas refunds until the houses were completed and utilities were installed on the properties.

Mr Sutherland counted the names of approximately eight builders who constructed homes in the Southwood Heights Subdivision. He said in those days builders constructed three or four homes per year. This yielded a construction rate of about 35 homes per year for the Southwood Heights Subdivision. Mr Sutherland said that numbering of the lots began with one and followed consecutively. Based on this fact and the construction rate of 35 homes per year he estimated construction of Southwood Heights began in 1955.

Mr Sutherland also discussed a record showing that a property with a cottage located near 79th and Arlington was purchased in 1955. He said the deal was probably made just before the properties on Arlington were developed. This record also supported the initiation of development of the subdivision in 1955.

## Confirmation of the Shooting Area South of 75th Street

Mr Sutherland said he had constructed the skeet shooting devices south of 75th street shown on the aerial photographs. He said the devices which were boxes approximately eight feet in height width and depth attached to metal poles above the ground were made for Mr Elliott. He said they housed a mechanism which threw clay pigeons into the air.

## Use of the Shooting Area South of 75th Street

Mr Sutherland said he believed the shooting area south of 75th Street was only used occasionally when there was overflow from the main shooting park north of 75th Street. He said that he remembered mining operations on the Elliott Shooting Park Site but not on the property south of 75th Street. Mr Sutherland said he believed straw was placed on the areas where shot was expected to land on the Elliott Shooting Park Site to catch the shot and make mining easier. He did not remember use of straw in the shooting area south of 75th Street. Mr Sutherland also said he did not remember any lead piles dumping areas or wells on the area south of 75th Street.

#### Drainage of the Property South of 75th Street

Mr Sutherland said drainage of the Southwood Heights Subdivision followed the general drainage pattern of the land prior to development. Runoff before development flowed overland towards the southwest and into the drainage gully between the cemetary and the property now defined as directly west of Elm Street Development of both Southwood Heights and Parkway Manor Subdivisions included installation of storm sewers. Mr Sutherland said a few ponds were filled in the development of Southwood Heights Subdivision near the center of the subdivision. Mr Sutherland pointed out these small ponds in the 1936 aerial photograph. Mr Sutherland said the streets were cut to facilitate drainage when the subdivision was developed. Mr Sutherland said Mr Harvey Jones was the engineer for the development of both subdivisions. He also said he thought Mr Jones and the County would have the paving drainage water and wastewater plans for both subdivisions.